



MetNet Precursor - Network Mission to Mars

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We are developing a new kind of planetary exploration mission for Mars – MetNet in situ observation network based on a new semi-hard landing vehicle called the Met-Net Lander (MNL). The first MetNet vehicle, MetNet Precursor, slated for launch in 2011. The MetNet development work started already in 2001. The actual practical Precursor Mission development work started in January 2009 with participation from various space research institutes and agencies. The scientific rationale and goals as well as key mission solutions will be discussed.

The eventual scope of the MetNet Mission is to deploy some 20 MNLs on the Martian surface using inflatable descent system structures, which will be supported by observations from the orbit around Mars. Currently we are working on the MetNet Mars Precursor Mission (MMPM) to deploy one MetNet Lander to Mars in the 2011 launch window as a technology and science demonstration mission.

The MNL will have a versatile science payload focused on the atmospheric science of Mars. Time-resolved in situ Martian meteorological measurements acquired by the Viking, Mars Path

finder and Phoenix landers and remote sensing observations by the Mariner 9, Viking, Mars Global Surveyor, Mars Odyssey and the Mars Express orbiters have provided the basis for our current understanding of the behavior of weather and climate on Mars. However, the available amount of data is still scarce and a wealth of additional in situ observations are needed on varying types of Martian orography, terrain and altitude spanning all latitudes and longitudes to address microscale and mesoscale atmospheric phenomena. Detailed characterization of the Martian atmospheric circulation patterns and climatological cycles requires simultaneous in situ atmospheric observations. The scientific payload of the MetNet Mission encompasses separate instrument packages for the atmospheric entry and descent phase and for the surface operation phase.

The MetNet mission concept and key probe technologies have been developed and the critical subsystems have been qualified to meet the Martian environmental and functional conditions. The flight unit of the landing vehicle has been manufactured and tested. This development effort has been fulfilled in collaboration between the Finnish Meteorological Institute (FMI), the Russian Lavoschkin Association (LA) and the Russian Space Research Institute (IKI) since August 2001. INTA (Instituto Nacional de Técnica Aeroespacial) from Spain joined the MetNet Mission team in 2008, and is participating significantly in the MetNet payload development.